REMARKS

Applicant affirms the election of Group I, claims 1-13 and 22-34. Claims 14-21, which are drawn to a non-elected invention, are canceled herein without prejudice to their refiling in a continuation application.

Claims 1, 5-7, 22, and 25 remain from the present application. New claims 35-42 are added herein, support for which may be found in the parent application No. 10/226,672, the disclosure of which is incorporated by reference in its entirety in the present application.

Claims 1, 5-7, 22, 25 and 35-38 are directed to solid brazing components that are made of an alloy consisting essentially of the specified alloy constituents in the specified ranges. The specification includes numerous examples of alloys of the present invention and their properties and benefits that support the non-obviousness of the claimed invention. Claims 39-42 are directed to fluxless solid brazing components of the forms recited that consist of the elements recited. The PL 149319 reference does not disclose each of the alloy constituents in the claimed range, and discloses the alloy in powder form in mixture with a flux carrier to form a brazing paste, not a solid brazing component. Notably, the PL 149319 reference specifies a tin (Sn) range with an upper limit of 25 wt.% and a phosphorus (P) range with a lower limit of 0.1 wt.%, and provides a specific example that includes 25 wt.% tin and 0.1 wt.% phosphorus. The tin content far exceeds the 8 wt.% upper limit and the phosphorus content is far lower than the 4 wt.% lower limit recited in the present claims. Significantly, a copper alloy with 0.1 wt.% P will not form a brazed joint in the absence of a flux. The phosphorus is present in insufficient quantity to act as a deoxidizer without a flux, and the deoxidizer is necessary to cleanse the

copper to allow the copper to form the braze. Thus, the specific example provided in the PL 149319 reference cannot be used to form a solid brazing component in the forms claimed. The phosphorus-copper brazing alloys of the present invention generally have the advantage of being capable of forming brazed joints between copper-based parts without the use of a flux, which enables their use in a wide variety of environments. The phosphorus content is such that the alloy is "self-fluxing" for the brazing of copper-based parts. The PL 149319 reference only discloses a brazing paste, which must contain a flux carrier or be used with a flux carrier, and the alloy powder would be inoperable for brazing in the absence of the flux carrier for at least a significant portion of the disclosed ranges. Thus, the present invention is directed to a solid brazing component as opposed to the powder/flux paste disclosed in the PL 149319 reference, and the PL 149319 reference does not teach or suggest a solid component given that their specific alloy example would be inoperative as such. With respect to claims 39-42, the "consists of" language precludes the presence of a flux.

Also, high tin contents in phosphorus-copper brazing alloys prevent or render extremely difficult the manufacture of the alloy into the claimed solid component forms. The high tin content contributes to brittleness in the alloy. After the alloy is cast into a billet, the billet is further processed by extrusion into wire or rolling into sheet or foil form, and brittleness in the alloy from the high tin content will result in a "hot short" in the material, which refers to the breaking of the material into pieces. So, certain alloys disclosed in the PL 149319 reference cannot be made into solid components due to brittleness from the high tin content. In fact, the PL 149319 reference states that the paste permits brazing below 973 K to "prevent

embrittlement" of the brazed contacts, which suggests to one of ordinary skill that the alloy would not survive the high temperatures and pressures used in processing brazing alloys into solid form without experiencing embrittlement or "hot shorting."

The variance in the individual and combined phosphorus and tin contents of the PL 149319 reference from the teachings and claims of the present invention make clear that the PL 149319 reference is not directed to the specific alloys recited in the present claims. The present invention does not merely provide an optimization of the component ranges disclosed in the PL 149319 reference, but rather, provides a brazing component that is entirely different than that taught or suggested in the PL 149319 reference. Morever, claims 39-42 preclude the existence of a carrier, thereby providing a fluxless or self-fluxing solid component.

It also cannot be assumed that the PL 149319 reference teaches alloys having the same properties and advantages as the claimed alloy. A higher amount of tin and a lower amount of phosphorus each affect the basic and material properties of the alloy. As can be seen from the numerous examples provided in the instant application, small changes in constituent contents have a marked affect on the temperature behavior of the alloy. Because the present invention claims an alloy consisting essentially of 0.1-8% tin and 4-10% phosphorus, and the PL 149319 reference specifically teaches a higher amount of tin and a lower amount of phosphorus, the reference does not teach or suggest the present invention.

The CN 1060052 reference discloses a low-temperature solder and a middle-temperature solder, both of which would have a liquidus temperature below 840°F by definition of a solder. Each solder composition also contains alloy components that are precluded by the

"consisting essentially of" language of the present claims, such as Zr, Ti, Ce and Zn. The CN 1060052 reference relates to solders and the PL 149319 reference relates to brazing pastes, and they are not one in the same. The formation of a brazing alloy as a solid component is not a mere choice between well-known forms of brazing alloys, but rather, is dependent upon finding a composition that can suitably be processed into a solid component. In addition, the solid components can be used in environments that pastes cannot be used. Solders have traditionally been formed into solid forms because they are more malleable than brazing alloys. Thus, the fact that a solder composition can be processed into a strip or rod form does not teach or suggest that a brazing composition can be likewise processed into solid forms. As discussed above, "hot shorts" are far more common among brazing alloys than among solders.

With specific reference to claims 35-42, there is absolutely no teaching or suggestion in either reference of the proviso that the tin/antimony content is limited to 10% total. Thus, claims 35-42 are allowable for this additional reason.

This amendment is submitted together with a Request for Continued Examination and a request for a suspension of action for 3 months. Applicant intends to submit a Supplemental response to support the position of non-obviousness.

Applicants are of the opinion that an additional fee in the amount of $100 is due as a result of this amendment. Please charge the amount of $100 to Deposit Account No. 23-3000. If any charges or credits are necessary to complete this communication, please apply them to Deposit Account No. 23-3000.

Application Serial No. 10/628,651
Amendment dated May 31, 2005

Respectfully submitted,

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for Serial No. 10/628,651

THANK YOU

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